UNITED STATES DEPARTMENT OP COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California **90802-** 4213

OCT - 2 2003

In **Reply** Refer To:
SWR-00-SA-0095:JCB

Colonel Michael J. Conrad Jr.
District Engineer, Sacramento District
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Dear Colonel Conrad:

Enclosed is the National Marine Fisheries Service's (NOAA Fisheries) biological opinion based on our review of the proposed Captain's Table Resort & Marina project (CTRMP) located in Sacramento, Sacramento County, California, and its effects on endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon *(O. tshawytscha)*, threatened Central Valley steelhead *(O. mykiss)* and the designated critical habitat of Sacramento River winter-run Chinook salmon in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your request for formal consultation was received on January 31, 2000.

This biological opinion (Enclosure 1) is based on information from the following sources: 1) CTRMP Draft Environmental Impact Report, dated October 1998; 2) CTRMP Final Environmental Impact Report, dated April 1999; 3) Biological Assessment for CTRMP, dated February 2001; 4) Amended Biological Assessment for CTRMP, dated May 2002; 5) revised project description, dated July 22, 2002; and 6) meetings on September 25, 2001 and December 18, 2001 between NOAA Fisheries staff and the applicant's representative (Kleinschmidt Associates). A complete administrative record of this consultation is on file at the NOAA Fisheries Sacramento Office, 650 Capitol Mall, Suite 8-300, Sacramento, California, 95814-4706.

The biological opinion concludes that the proposed project is not likely to jeopardize the continued existence of the above listed species, nor will it result in the destruction or adverse modification of designated critical habitats. Because NOAA Fisheries believes there is the likelihood of an incidental take of listed species as a result of project construction and operation, an incidental take statement is included with the biological opinion. This incidental take statement includes reasonable and prudent measures that NOAA Fisheries believes are necessary and appropriate to reduce, minimize, and monitor project impacts. Terms and conditions to implement the reasonable and prudent measures are presented in the incidental take statement and must be adhered to in order for take incidental to this project to be exempted from the take prohibitions of the ESA.

In addition, we have attached an Essential Fish Habitat (EFH) consultation document including EFH Conservation Recommendations (Enclosure 2). The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) set forth new mandates for the NOAA Fisheries and federal action agencies to protect important marine and anadromous fish habitats. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NOAA Fisheries regarding potential adverse effects of their actions on EFH, and respond in writing to NOAA Fisheries "EFH Conservation Recommendations." The Pacific Fisheries Management Council has identified EFH for the Pacific salmon fishery in Amendment 14 to the Pacific Coast Salmon Fishery Management Plan. This EFH designation includes the habitat found in the lower Sacramento River which is affected by the proposed expansion of the CTRMP.

We appreciate your continued cooperation in the conservation of listed species and their habitat, and look forward to working with you and your staff in the future. If you have any questions regarding this document, please contact Mr. John Baker in our Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, CA 95814. Mr. Baker may be reached by telephone at (916) 930-3616 or by Fax at (916) 930-3629.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Acting Regional Administrator

Enclosures (2)

cc: NMFS-PRD, Long Beach, CA
Stephen A. Meyer, ASAC, NMFS, Sacramento, CA

Enclosure 1

Endangered Species Act - Section 7 Consultation

BIOLOGICAL OPINION

ACTION AGENCY: U.S. Army Corps of Engineers

ACTIVITY: Captain's Table Resort & Marina Project

CONSULTATION CONDUCTED BY: Southwest Region, National Marine Fisheries Service

DATE ISSUED: OCT - 2 2003

I. CONSULTATION HISTORY

On January 31, 2000, the U.S. Army Corps of Engineers (Corps) requested formal consultation with the National Marine Fisheries Service (NOAA Fisheries), pursuant to section 7 of the Endangered Species Act (ESA), to determine the potential effects of the Captain's Table Resort & Marina project (CTRMP) on endangered Sacramento River winter-run Chinook salmon *(Oncorhynchus tshawytscha),* threatened Central Valley spring-run Chinook salmon *(O. tshawytscha),* and threatened Central Valley steelhead *(O. mykiss),* and their critical habitat.

On March 2, 2000, NOAA Fisheries responded to the Corps with a request for a biological assessment (BA) or equivalent information in order to complete the initiation package.

On February 9, 2001, a BA was submitted to NOAA Fisheries by the applicant's representative (Kleinschmidt Associates).

On April 9, 2001, Beth Campbell of NOAA Fisheries visited the project site.

On April 11, 2001, NOAA Fisheries responded directly to the Corps and outlined additional information and clarification of the project description that would be required to complete the initiation package. NOAA Fisheries also noted in this communication that the project area is identified as "Essential Fish Habitat" (EFH) in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the Magnuson- Stevens Fishery Conservation and Management Act (MSA), and reminded the Corps that Federal action agencies are mandated by MSA (section 305[b][2]) to consult with NOAA Fisheries on all actions that may adversely affect EFH.

On July 25, 2001, NOAA Fisheries met with the applicant's representatives (Kleinschmidt Associates and HART, Incorporated) to discuss the project description and proposed measures to avoid and minimize impacts to ESA-listed salmonids.

On September 24, 2001, Kleinschmidt submitted an addendum to the BA to NOAA Fisheries.

On October 30, 2001, NOAA Fisheries responded directly to the Corps stating that all information required to initiate consultation had been received, and that NOAA Fisheries's biological opinion for the CTRMP was expected to be completed no later than February 6, 2002.

On December 18, 2001, NOAA Fisheries met with Kleinschmidt Associates to discuss minor changes to the project description.

On January 29, 2002, NOAA Fisheries suspended consultation pending the project's review and approval by the California Reclamation Board. Previous reviews of the project by the California Reclamation Board resulted in significant changes to the project description.

On July 30, 2002, NOAA Fisheries received an amended project description from the Corps and consultation was restarted.

II. DESCRIPTION OF THE PROPOSED ACTION

A. Description of the Proposed Action

The Corps proposes to issue a permit to Robert Leech, Captain's Table Hotel, LLC to discharge dredged or fill material to remove the existing dock and construct a marina at approximately river mile (RM) 55.4 of the Sacramento River in the City of Sacramento, California. The Corps proposes to issue this permit pursuant to section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act of 1899. Project construction is proposed to occur during the June 1 to August 31 period of 2003 and 2004.

1. Construction Activities

The existing dock would be removed by cutting the pilings at the mud-lines and removing them with a crane, and the sunken barge (30 feet by 60 feet) would be raised and towed to an approved disposal site. Approximately 550 linear feet of shoreline would be stabilized by excavation of approximately 1,325 cubic yards of native material and placement of 6,725 cubic yards of imported rock slope protection (riprap).

The proposed new floating dock and gangways will be approximately 1,050 feet by 8 feet and 65 feet by 6 feet respectively, with a surface area of approximately 10,500 square feet. Thirty 24 inch diameter steel pilings will be driven into the Sacramento River on 40 foot centers to support the floating dock and gangways. A screened water intake structure to pump water for on-site irrigation and fire suppression will be installed as part of the project. A 50 foot by 10 foot debris deflector supported by two pilings would be constructed upstream of the dock. The proposed dock will contain side-tie slips only and will be able to accommodate approximately 20 guest's boats, inclusive of short-term, seasonal rental boats and slips.

2. Interrelated Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for justification (50 CFR 402.02). Actions interrelated to the proposed project include the construction of a three-story hotel on the landward side of the existing levee, a bicycle trail, and improvements to parking areas on both sides of the existing levee to accommodate seasonal parking for the general public and the proposed marina and hotel. The existing 0.59 acre parking lot on the waterside of the levee will be improved through regrading and hard surfacing.

3. Conservation and Restoration Measures

The applicant has committed to incorporate several conservation and restoration measures as part of their project construction and operation which are intended to avoid or minimize impact to listed species associated with the proposed project.

a. All woody plants greater than 4 inches diameter at breast height (dbh) will be preserved in place. The new rock slope protection area as well as the balance of the center portion (730 linear feet) of the project shoreline will be planted with willow wattles at 10- to 15-foot staggered centers. The disturbed area above the mean low water line (MLWL) will be planted with native woody plant species *(e.g.,* alder and elderberry), and spaced at 10 foot staggered centers. Biodegradable ballast buckets planted with native species (*e.g.*, bullrush, rush, and sedge) will be installed on the river bank for bank-to-toe stabilization. Buckets at 10 foot staggered centers will be placed in all areas that are disturbed by the rock slope protection and at 2- to 3 foot staggered centers outside the rock slope protection area. Nonnative vegetation will be eliminated to the greatest degree possible to provide conditions that will allow native plant species to reestablish. Following construction, a constant supply of water will be made available to irrigate the native plants. In addition, project personnel with appropriate training will be on-site and committed to insuring a high survival rate is achieved with the plants

b. The dock will incorporate a floating eco-dock design that will feature live native plants anchored to the floating side-tie slips. When the plants are mature the eco-dock will provide approximately 1,800 square feet of shaded riparian habitat along the shoreline of the 10,500 square foot floating dock.

c. The marina will not serve as a long-term stowage facility for boats, but will provide for seasonal rentals and a docking facility for boating guests to visit the hotel. No fueling stations, sewage pump-out facilities, dry dock, boat launch or ramp will be included in the proposed project.

d. Stormwater from the project parking lot will be directed through a sand/soil interceptor to filter pollutants and ultimately will enter the City of Sacramento's storm water collection system on Riverside Boulevard.

e. Instream construction activities will be limited to the period June 1 to August 31, 2003 and 2004.

f. Siltation of the Sacramento River shall be prevented through implementation of Best Management Practices (BMP) such as physical or vegetative bank stabilization, diversion or velocity reduction of run-off, and sediment trapping and filtering.

g. Refueling of heavy equipment and vehicles will not occur within the flowing stream channel.

h. Litter and construction debris shall be removed from river channel and disposed of at an appropriate upland site.

i. Temporary erosion control measures, such as straw bales or silt curtains, shall be used during grading activities to avoid increased turbidity impacts to the Sacramento River.

j. All construction materials which have the potential to contaminate the riparian habitat *(e.g.,* fuels, paints, solvents, and cement additives) shall be identified in advance of construction. A plan shall be provided by each contractor using such materials covering storage, use, and cleanup for all such materials. An Emergency Response Plan shall be provided by the lead contractor or supervising agency to cover spills of such materials.

k. Prior to project construction the applicant shall provide a Stormwater Management plan for approval by the City of Sacramento Utilities Department in accordance with the City of Sacramento's Stormwater Management New Development Management Program. The plan shall include pollution treatment controls such as vegetated swales, filter strips, media filters, and/or infiltration devices for incorporation into the project design to reduce the pollutants once they enter Stormwater runoff. Source controls also shall be required to eliminate or reduce the introduction of pollutants into Stormwater discharges.

1. A parking lot cleaning and maintenance program will be implemented to minimize the introduction of toxic materials into the Sacramento River from parking lot runoff. The program will include at least weekly mechanical cleaning of all paved areas and parking lots, including enclosed areas. Maintenance personnel will be instructed to promptly clean any oil/grease or other toxic deposits discovered on the premises.

m. A 5 miles per hour (mph) speed zone for boaters will be established in the river reach starting at approximately Sacramento River mile 55.5 and continuing downstream to Sacramento River mile 53.5.

n. Pre- and post-construction water quality monitoring will be conducted to access the impacts on the marina on fish habitat. Monitoring will include monthly data sampling for dissolved oxygen (DO), water temperature, total suspended sediments (TSS), and

water velocity from March to October for three years. If the monitoring data demonstrate negative impacts, the applicant will consult with NOAA Fisheries and U.S. Fish and Wildlife Service (FWS) to improve conditions for listed species.

B. Delineation and Description of the Action Area

The action area is defined in 50 CFR 402.02 as all areas to be affected directly or indirectly by the federal action, and not merely the immediate area involved in the action. The action area for this project includes the active stream channels and riparian corridors of the Sacramento River within the river reach starting approximately 1,000 feet upstream of and including CTRMP (38° 32'22" N, 121°30'46" W, Sacramento River mile 55.5), and continuing downstream approximately 2.3 miles below CTRMP (38° 31'00" N, 121°32'09" W, Sacramento River mile 53.5) (Figure 1). The action area includes the immediate project area and that area identified as being impacted from increased boating activity.

III. STATUS OF LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

This biological opinion analyzes the effects of the CTRMP on the following threatened and endangered species:

Sacramento River winter-run Chinook salmon - endangered
Central Valley spring-run Chinook salmon - threatened
Centra] Valley steelhead - threatened

In addition, the action area is within the designated critical habitat for Sacramento River winter-run Chinook salmon.

A. Species Life History, Population Dynamics, and Likelihood of Survival and Recovery

1. Sacramento River Winter-Run Chinook Salmon

Sacramento River winter-run Chinook salmon originally were listed as threatened in November, 1990 (55 FR 46515). This status was reclassified as endangered in January 1994 (59 FR 440) due to a continuing decline and increased variability of run sizes since their listing as a threatened species, expected weak returns as a result of two small year classes in 1991 and 1993, and continuing threats to the population. NOAA Fisheries recognized that the population had dropped nearly 99 percent between 1966 and 1991, and despite conservation measures to improve habitat conditions, the population continued to decline (57 FR 27416). A draft recovery plan was published in August 1997 (NOAA Fisheries 1997).

Critical habitat for winter-run Chinook salmon was designated on June 16, 1993 and includes the Sacramento River from Keswick Dam (RM 302) downstream to Chipps Island (RM O) at

the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and

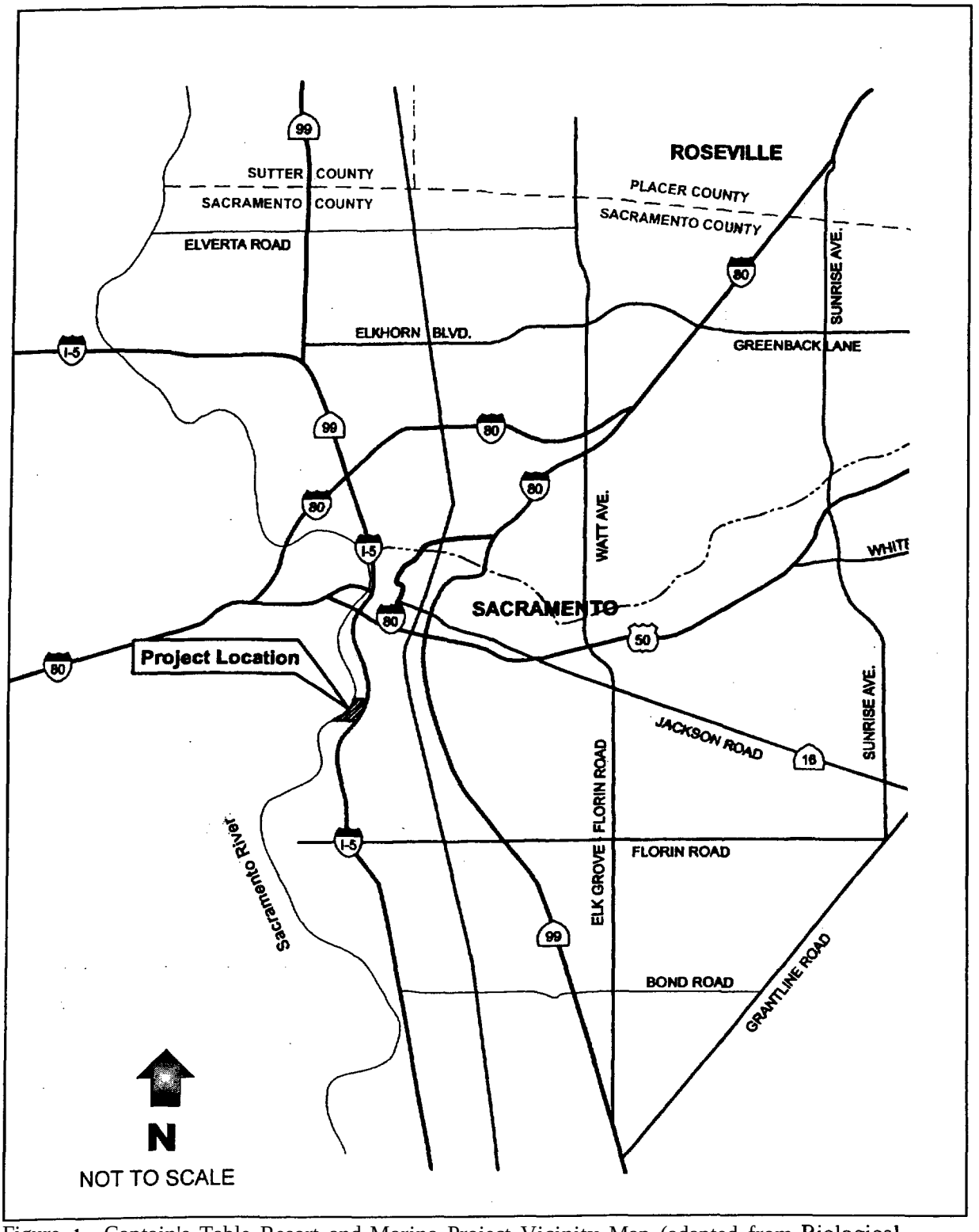

Figure 1. Captain's Table Resort and Marina Project Vicinity Map (adapted from Biological Assessment, Captain's Table LLC, Kleinschmidt Assoc., February 2001).

Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of the San Francisco Bay (north of the San Francisco Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. The critical habitat designation identifies those physical and biological features of the habitat that are essential to the conservation of the species and that may require special management consideration or protection. Within the Sacramento River this includes the river water, river bottom (including those areas and associated gravel used by winter-run Chinook salmon as spawning substrate), and adjacent riparian zone used by fry and juveniles for rearing.

Winter-run Chinook salmon historically spawned in the headwaters of the McCloud, Pit, and Little Sacramento rivers and Hat and Battle creeks. Construction of Shasta Dam in 1943 and Keswick Dam in 1950 blocked access to all of these waters except Battle Creek, which is blocked by a weir at the Coleman National Fish Hatchery and other small hydroelectric facilities (Moyle 1989, NOAA Fisheries 1997). Most of the current winter-run Chinook salmon spawning and rearing habitat exists between Keswick Dam and Red Bluff Diversion Dam (RBDD) in the Sacramento River.

Adult winter-run Chinook salmon enter San Francisco Bay from November through June (Hallock and Fisher 1985) and migrate past RBDD from mid-December through early August (NOAA Fisheries 1997). The majority of the run passes RBDD from January through May, and peaks in mid-March (Hallock and Fisher 1985). Generally, winter-run Chinook salmon spawn from near Keswick dam, downstream to Red Bluff. Spawning occurs from late April through mid-August with peak activity between May and June. Eggs and pre-emergent fry require water temperatures at or below 56 °F for maximum survival during the spawning and incubation period (Boles *et al.* 1988). Fry emerge from mid-June through mid-October and move to river margins to rear. Emigration past RBDD may begin in mid-July, typically peaks in September, and can continue through March in dry years (NOAA Fisheries 1997, Vogel and Marine 1991). From 1995 to 1999, all winter-run Chinook salmon outmigrating as fry passed RBDD by October, and all outmigrating pre-smolts and smolts passed RBDD by March (Martin *et al.* 2001).

Since 1967, the estimated adult winter-run Chinook salmon population ranged from 186 in 1994 to 117,808 in 1969 (DFG 2002). The estimate declined from an average of 86,000 adults in 1967-1969 to only 2,000 by 1987-1989, and continued downward to an average 830 fish in 1994-1996. Since then, estimates have increased to an average of 4,268 fish for the period of 1998-2002. Winter-run Chinook salmon abundance estimates and cohort replacement rates since 1986 are shown in Table 1. Although the population estimates from the RBDD counts display broad fluctuation since 1986 (186 in 1994 to 9,172 in 2002), there is an increasing trend in the five year moving average over the last five year period (491 from 1990-1994 to 2349 from 1998-2002), and a generally stable trend in the five year moving average of cohort replacement rates. The 2002 run was the highest since the listing, with an estimate of 9,172 adult fish.

Table].- Winter-run Chinook salmon population estimates from Red Bluff Diversion Dam counts, and corresponding cohort replacement rates for years since 1986.

Year	Population Estimate	5 Year Moving Average of Population Estimate	Cohort Replacement Rate	5 Year Moving Average of Cohort Replacement Rate
1986	2596	-	0.27	-
1987	2186	-	0.20	-
1988	2886	-	0.07	-
1989	697	-	1.78	-
1990	431	1759	0.90	0.64
1991	211	1282	0.88	0.77
1992	1241	1093	1.04	0.93
1993	387	593	3.45	1.61
1994	186	491	4.73	2.20
1995	1287	662	2.33	2.49
1996	1337	888	1.71	2.65
1997	880	815	1.54	2.75
1998	3005	1339	1.84	2.43
1999	2288	1759	4.01	2.29
2000	1352	1772	-	-
2001	5521	2609	-	-
2002	9172	4268	-	-

In addition to the loss of key upstream habitat behind Shasta Dam, numerous other factors have contributed to the decline of winter-run Chinook salmon by degrading spawning, rearing, and migration habitats. The primary impacts include warm water releases from Shasta Dam, juvenile and adult passage constraints at RBDD, water exports in the south Sacramento-San Joaquin Delta, heavy metal contamination from Iron Mountain Mine, and entrainment in a large number of unscreened or poorly screened water diversions. Secondary factors include smaller water manipulation facilities and dams, loss of rearing habitat in the lower Sacramento River and Sacramento-San Joaquin Delta from levee construction, marshland reclamation, and interaction with and predation by introduced species (NOAA Fisheries 1997). Since the listing of winter-run Chinook salmon, many habitat problems that led to the decline of the species have been addressed and improved through restoration and conservation actions.

The impetus for initiating restoration actions stem primarily from ESA temperature, flow, and diversion requirements (e.g., NOAA Fisheries' 1993 biological opinion addressing the effects of the Bureau of Reclamation's [BOR] operation of the Central Valley Project [CVP] and DWR's operation of the State Water Project [SWP] on winter-run Chinook salmon); State Water Resources Control Board (SWRCB) orders requiring compliance with Sacramento River water temperature objectives; a 1992 amendment to the authority of the CVP through the Central Valley Project Improvement Act (CVPIA) to give fish and wildlife equal priority with other CVP objectives (e.g., in section 3406[b][2], establishment of a water account to supplement CVPIA minimum flow requirements); fiscal support of habitat improvement projects from the CALFED Bay-Delta Program (e.g., installation of the Glenn-Colusa Irrigation District [GCID] fish screen, establishment of an Environmental Water Account [EWA], etc.); and EPA pollution control efforts to alleviate acidic mine drainage from Iron Mountain Mine.

Recent trends in winter-run Chinook salmon abundance and cohort replacement are positive and indicate some recovery since the listing. However, the population remains particularly susceptible to extinction because of the reduction of their genetic pool to one population.

1. Central Valley Spring-Run Chinook Salmon

NOAA Fisheries listed the Central Valley spring-run Chinook salmon evolutionarily significant unit (ESU) as threatened on September 16, 1999 (64 FR 50394), and published a final 4(d) rule for this ESU on January 9, 2002 (67 FR 1116). Historically, spring-run Chinook salmon were the dominant run in the Sacramento River Basin, occupying the middle and upper elevation reaches (1,000 to 6,000 feet) of most streams and rivers with sufficient habitat for over-summering adults (Clark 1929). Clark estimated that there were 6,000 miles of salmon habitat in the Central Valley Basin (much which was high elevation spring-run Chinook salmon habitat) and that by 1928, 80 percent of this habitat had been lost. Yoshiyama *et al.* (1996) determined that, historically, there were approximately 2,000 miles of salmon habitat available prior to dam construction and mining and that only 18 percent of that habitatremains.

Adult spring-run Chinook salmon enter the Delta from the Pacific Ocean beginning in January and enter natal streams from March to July. In Mill Creek, Van Woert (1964) noted that of 18,290 spring-run Chinook salmon observed from 1953 to 1963, 93.5 percent were counted between April 1 and July 14, and 89.3 percent were counted between April 29 and June 30.

During their upstream migration, adult Chinook salmon require streamflows sufficient to provide olfactory and other orientation cues used to locate their natal streams. Adequate streamflows are also necessary to allow adult passage to upstream holding habitat. The preferred temperature range for upstream migration is 38 °F to 56 °F (Bell 1991; DFG 1998).

Upon entering fresh water, spring-run Chinook salmon are sexually immature and must hold in cold water for several months to mature. Typically, spring-run Chinook salmon utilize mid- to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow oversummering. Spring-run Chinook salmon may also utilize tailwaters below dams if cold water releases provide suitable habitat conditions. Spawning occurs between September and October and, depending on water temperature, emergence occurs between November and February.

Spring-run Chinook salmon emigration is highly variable (DFG 1998). Some may begin outmigrating soon after emergence, whereas others oversummer and emigrate as yearlings with the onset of increased fall storms (DFG 1998). The emigration period for spring-run Chinook salmon extends from November to early May, with up to 69 percent of young-of-the-year outmigrants passing through the lower Sacramento River between mid-November and early January (Snider and Titus 2000). Outmigrants are also known to rear in non-natal tributaries to the Sacramento River, and the Delta (DFG 1998).

Chinook salmon spend between one and four years in the ocean before returning to their natal streams to spawn (Myers *et al.* 1998). Fisher (1994) reported that 87 percent of Chinook trapped and examined at Red Bluff Diversion Dam (RBDD) between 1985 and 1991 were three-year-olds.

Spring-run Chinook salmon were once the most abundant run of salmon in the Central Valley (Campbell and Moyle 1992) and were found in both the Sacramento and San Joaquin drainages. More than 500,000 spring-run Chinook salmon were caught in the Sacramento-San Joaquin commercial fishery in 1883 alone (Yoshiyama *et al.* 1998). The San Joaquin populations essentially were extirpated by the 1940s, with only small remnants of the run that persisted through the 1950s in the Merced River (Hallock and Van Woert 1959, Yoshiyama *et al.* 1998). Populations in the upper Sacramento, Feather, and Yuba Rivers were eliminated with the construction of major dams during the1950s and 1960s. Naturally-spawning populations of spring-run Chinook salmon currently are restricted to accessible reaches of the upper Sacramento River, Antelope Creek, Battle Creek, Beegum Creek, Big Chico Creek, Butte Creek, Clear Creek, Deer Creek, Mill Creek, Feather River, and the Yuba River (DFG 1998).

Since 1969, the Central Valley spring-run Chinook salmon ESU has displayed broad fluctuations in abundance, ranging from 1,403 in 1993 to 25,890 in 1982 (DFG unpublished data, 2003). The average abundance for the ESU was 12,590 for the period of 1969 to 1979, 13,334 for the period of 1980 to 1990, and 6,554 from 1991 to 2001. Evaluating the abundance of the ESU as a whole, however, complicates trend detection. For example, although the mainstem Sacramento River population appears to have undergone a significant decline, the data are not necessarily comparable because coded wire tag information gathered from fall-run Chinook salmon returns since the early 1990s has resulted in adjustments to ladder counts at RBDD that have reduced the overall number of fish that are categorized as spring-run Chinook salmon (Colleen Harvey-Arrison, DFG, pers. comm., 2003).

Sacramento River tributary populations in Mill, Deer, and Butte Creeks are probably the best trend indicators for spring-run Chinook salmon abundance. These streams have shown positive escapement trends since 1991, yet recent escapements to Butte Creek, including 20,259 in 1998, 9,605 in 2001 and 8,785 in 2002, are responsible for the magnitude of tributary abundance (DFG unpublished data 2002; 2003). Although recent tributary production is promising, annual abundance estimates display a high level of fluctuation and the overall number of Central Valley spring-run Chinook salmon remains well below estimates of historic abundance.

The initial factors that led to the decline of Central Valley spring-run Chinook salmon were related to the loss of upstream habitat behind impassible dams. Since this initial loss of habitat, other factors have contributed to the decline of Central Valley spring-run Chinook salmon and affected the ESU's ability to recover. These include a combination of physical, biological, and management factors such as climatic variation, water management, hybridization, predation, and harvest (DFG 1998). Although protective measures likely have led to recent increases in Central Valley spring-run Chinook salmon abundance, the ESU still is below levels observed from the 1960s through 1990. Because threats to the spring-run Chinook salmon ESU continue to persist, and because the ESU is confined to relatively few remaining streams and continues to display broad fluctuations in abundance, the population is at moderate risk of extinction.

2. Central Valley Steelhead

NOAA Fisheries listed the Central Valley Steelhead ESU as threatened on March 19, 1998 (63 FR 13347). The ESU includes all naturally-produced Central Valley Steelhead in the Sacramento-San Joaquin River Basin. NOAA Fisheries published a final 4(d) rule for Central Valley Steelhead on July 10, 2000 (65 FR 42422).

All Steelhead stocks in the Central Valley are winter-run Steelhead (McEwan and Jackson 1996). Steelhead are similar to Pacific salmon in their life history requirements. They are born in fresh water, emigrate to the ocean, and return to freshwater to spawn. Unlike other Pacific salmon, Steelhead are capable of spawning more than once before they die.

The majority of the Steelhead spawning migration occurs from October through February, and spawning occurs from December to April in streams with cool, well oxygenated water that is available year round. Van Woert (1964) and Harvey (1995) observed that in Mill Creek, the Steelhead migration is continuous, and although there are two peak periods, sixty percent of the run is passed by December 30. Similar bimodal run patterns have also been observed in the Feather River (Ryan Kurth, DWR, pers. comm., 2002), and the American River (John Hannon, BOR, pers. comm., 2002).

Egg incubation time is dependent upon water temperature. Eggs held between 50 °F and 59 °F hatch within three to four weeks (Moyle 1976). Fry usually emerge from redds after about four to six weeks depending on redd depth, gravel size, siltation, and water temperature (Shapovalov and Taft 1954). Newly emerged fry move to shallow stream margins to escape high water velocities and predation (Barnhart 1986). As fry grow larger they move into riffles and pools and establish feeding locations. Juveniles rear in freshwater for one to four years (Meehan and Bjornn 1991) emigrating episodically from natal springs during fall, winter, and spring high flows (Colleen Harvey-Arrison, DFG, pers. comm.,1999). Steelhead typically spend two years in fresh water. Adults spend one to four years at sea before returning to freshwater to spawn as four- or five-year-olds (Moyle 1976).

Steelhead historically were well-distributed throughout the Sacramento and San Joaquin Rivers (Busby *et al.* 1996). Steelhead were found from the upper Sacramento and Pit River systems, south to the Kings and possibly the Kern River systems, and in both east- and west-side Sacramento River tributaries (Yoshiyama *et al.* 1996). The present distribution has been greatly reduced (McEwan and Jackson 1996). The California Advisory Committee on Salmon and Steelhead (1988) reported a reduction of Steelhead habitat from 6,000 miles historically to 300 miles. The California Fish and Wildlife Plan (DFG 1965) estimated there were 40,000 Steelhead in the early 1950s. Hallock *et al* (1961) estimated an average of 20,540 adult Steelhead through the 1960s in the Sacramento River, upstream of the Feather River.

Existing wild Steelhead stocks in the Central Valley are mostly confined to upper Sacramento River and its tributaries, including Antelope, Deer, and Mill Creeks, and the Yuba River. Populations may exist in Big Chico and Butte Creeks, and a few wild Steelhead are produced in the American and Feather Rivers (McEwan and Jackson 1996). Until recently, Steelhead were thought to be extirpated from the San Joaquin River system. Recent monitoring has detected self-sustaining populations of Steelhead in the Stanislaus, Mokelumne, Calaveras, and other streams previously thought to be void of Steelhead (McEwan 2001). It is possible that naturally- spawning populations exist in many other streams but are undetected due to lack of monitoring programs (Interagency Ecological Program [IEP] Steelhead Project Work Team 1999).

Reliable estimates of Steelhead abundance for different basins are not available (McEwan 2001); however, McEwan and Jackson (1996) estimate the total annual run size for the entire Sacramento-San Joaquin system, based on RBDD counts, to be no more than 10,000 adults.

Steelhead counts at the RBDD have declined from an average of 11,187 for the period of 1967 to 1977, to an average of approximately 2,000 through the 1990s (McEwan and Jackson 1996, McEwan 2001).

The factors affecting the survival and recovery of Central Valley Steelhead are similar to those affecting Central Valley spring-run Chinook salmon and primarily are associated with habitat loss (McEwan 2001). The future of Central Valley Steelhead is uncertain because of the lack of status and trend data.

B. Habitat Condition and Function for Species' Conservation

The freshwater habitat of salmon and Steelhead in the Sacramento-San Joaquin drainage varies in function, depending on location. Spawning areas are located in accessible, upstream reaches of the Sacramento or San Joaquin Rivers and their watersheds where viable spawning gravels and water conditions are found. Spawning habitat condition is strongly affected by water flow and quality - especially temperature, dissolved oxygen, and silt load - all of which can greatly affect the survival of eggs and larvae.

Migratory corridors are downstream of the spawning areas and include the Sacramento-San Joaquin Delta. These corridors allow the upstream passage of adults and the downstream emigration of outmigrant juveniles. Migratory habitat condition is strongly affected by the presence of barriers which can include dams, unscreened or poorly screened diversions, and degraded water quality.

Both spawning areas and migratory corridors comprise rearing habitat for juveniles, which feed and grow before and during their outmigration. Non-natal, intermittent tributaries also may be used for juvenile rearing. Rearing habitat condition and function may be affected by annual and seasonal flow and temperature characteristics. Specifically, the lower reaches of streams often become less suitable for juvenile rearing during summer. Rearing habitat condition and function are strongly affected by habitat complexity, food supply, and presence of predators of juvenile salmonids. Some complex, productive habitats with floodplains remain in the system (e.g., the lower Cosumnes River, Sacramento River reaches with setback levees [i.e., primarily located upstream of the City of Colusa]); however, the channelized, leveed, and rip-rapped river reaches and sloughs that are common in the Sacramento-San Joaquin system typically have low habitat complexity, low abundance of food organisms, and offer little protection from either fish or avian predators.

C. Factors Affecting the Species and Habitat

Profound alterations to the riverine habitat of the Central Valley began with the discovery of gold in the mid-1800s which resulted in increased sedimentation, reducing spawning and rearing habitat quality from mining activities and land uses. Other human activities have contributed to the decline in Central Valley anadromous salmonids and their habitats,

eventually leading to listing the species under the ESA. These activities are ongoing and continue to affect the species, and include: (1) dam construction and continued use that blocks previously accessible spawning and rearing habitat; (2) water development activities that affect flow quantity, timing, and water quality; (3) land use activities such as agriculture, flood control, urban development, mining, and logging that degrade aquatic habitat and decrease prey abundance; (4) hatchery operation and practices; and (5) harvest activities.

Hydropower, flood control, and water supply dams of the Central Valley Project (CVP), State Water Project (SWP), and other municipal and private entities have permanently blocked or hindered salmonid access to historical spawning and rearing grounds. Large dams on every major tributary to the Sacramento and San Joaquin rivers block Chinook salmon and steelhead access to the upper portions of the respective watersheds. On the Sacramento River, Keswick and Shasta dams block passage to historic spawning and rearing habitat in the upper Sacramento, McCloud, and Pit rivers. On the Feather River, Oroville Dam and associated facilities block passage to the upper Feather River watershed. Nimbus Dam blocks access to most of the American River basin. Englebright Dam and Daguerre Point Dam block access to the upper Yuba River. The upper watersheds of these basins comprised preferred spawning and rearing habitat for Central Valley spring-run Chinook salmon and Central Valley Steelhead.

Depleted flows in dammed waterways have contributed to elevated temperatures, reduced dissolved oxygen levels, and decreased recruitment of gravel, large woody debris, and riparian vegetation (Spence *et al.* 1996). Historical seasonal flow patterns included high flood flows in the winter and spring with declining flows throughout the summer and early fall. With the completion of upstream reservoir storage projects throughout the Central Valley, the seasonal distribution of flows differs substantially from historical patterns. The magnitude and duration of peak flows during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies (CALFED Bay-Delta Program [CALFED] 2000). Water management now reduces natural variability by creating more uniform flows year-round that diminish natural channel forming, riparian vegetation, and food web functions.

Although many of the factors affecting Chinook salmon are common to Steelhead, some stressors –especially elevated summer water temperatures-have greater effects on Steelhead because juvenile Steelhead rear in freshwater for more than one year. Suitable Steelhead conditions primarily occur in mid to high elevation streams. Because most suitable habitat has been lost to dam construction, juvenile rearing is generally confined to lower elevation stream reaches. Many dams and reservoirs in the Central Valley do not have water storage capacity or release mechanisms necessary to maintain suitable water temperatures for Steelhead rearing through the critical summer and fall periods, especially during critically dry years (McEwan 2001).

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands, are found throughout the Central Valley. Hundreds of water diversions exist along the Sacramento River and its tributaries. Depending on the size, location, and season of operation, unscreened intakes may entrain many life stages of aquatic species, including juvenile salmonids.

About 150 years ago, the Sacramento River was bordered by up to 500,000 acres of riparian forest, with bands of vegetation literally spreading four to five miles (Resources Agency, State of California 1989). By 1979, riparian habitat along the Sacramento River diminished to 11,000-12,000 acres or about 2 percent of historic levels (McGill 1979). More recently, about 16,000 acres of remaining riparian vegetation has been reported (McGill 1987). Degradation and fragmentation of riparian habitat has resulted mainly from flood control and bank protection projects, together with the conversion of riparian land to agriculture (Jones and Stokes Associates 1993).

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is another cause of salmonid habitat degradation. Sedimentation can adversely affect salmonids during all freshwater life stages by clogging or abrading gill surfaces; adhering to eggs, inducing behavioral modifications including habitat avoidance or cessation of feeding, burying eggs or alevins, scouring and filling pools and riffles, reducing primary productivity and photosynthetic activity, and decreasing intergravel permeability and dissolved oxygen levels. Embedded substrates can reduce the production of juvenile salmonids and hinder the ability of some over-wintering juveniles to hide in the gravels during high flow events.

Land use activities associated with road construction, urban development, logging, mining, agriculture, and recreation have significantly altered fish habitat quantity and quality through alteration of streambank and channel morphology, alteration of ambient stream water temperatures, degradation of water quality, elimination of spawning and rearing habitat, fragmentation of available habitats, elimination of downstream recruitment of gravel and large woody debris, removal of riparian vegetation and elimination of large trees, and increased streambank erosion. Large woody debris influences stream morphology by affecting pool formation, channel pattern and position, and channel geometry. Organic input to the water course also provides nutrients necessary for primary productivity and as a food source for aquatic insects, who in turn are consumed by salmonids.

Hatchery practices as well as spatial, and temporal overlaps of habitat use and spawning activity between spring- and fall-run Chinook salmon has led to the hybridization and homogenization of some subpopulations (DFG 1998). As early as the 1960s, Slater (1963) observed that early fall-run fish were competing with spring-run Chinook salmon for spawning sites in the Sacramento River below Keswick Dam and speculated that the two runs may had hybridized. Feather River hatchery spring-run Chinook salmon have been documented as straying throughout Central Valley streams for many years (DFG 1998), and in many cases have been recovered from the spawning grounds of fall-run Chinook salmon (Colleen Harvey-

Arrison and Paul Ward, DFG, pers. comm., 2002). This indicates that Feather River Hatchery spring-run Chinook salmon may exhibit fall-run life history characteristics. Although the degree of hybridization has not been comprehensively determined, it is clear that the populations of spring-run Chinook salmon spawning in the Feather River and counted at RBDD contain hybridized fish.

Accelerated predation may also be a factor in the decline of Chinook salmon and Steelhead in the Central Valley. Although predation is a natural component of salmonid ecology, the rate of predation on Central Valley salmonids likely has greatly increased through the introduction of non-native predatory species such as striped bass and largemouth bass, and through the alteration of natural flow regimes and the development of structures that attract predators, including dams, bank revetment, bridges, diversions, piers, and wharfs (Stevens 1961, Vogel *et al.* 1988, Garcia 1989, Decato 1978). FWS staff found that more predatory fish occurred at rock revetment bank protection sites between Chico Landing and Red Bluff than at sites with naturally eroding banks (Michny and Hampton 1984). On the mainstem Sacramento River, high rates of predation are known to occur at RBDD, the Anderson-Cottonwood Irrigation District diversion, the Glenn-Colusa Irrigation District diversion, and at south Delta water diversion structures (DFG 1998). From October 1976 to November 1993, DFG conducted ten mark/recapture experiments at the SWP's Clifton Court Forebay to estimate pre-screen losses using hatchery-reared juvenile Chinook salmon. Pre-screen losses ranged from 69 percent to 99 percent. Predation from striped bass is thought to be the primary cause of the loss (DFG 1998, Gingras 1997).

Chinook salmon are harvested in ocean commercial, ocean recreational, and inland recreational fisheries. Coded wire tag returns indicate that Sacramento River salmon congregate off the coast between Point Arena and Morro Bay. Ocean fisheries have affected the age structure of spring-run Chinook salmon through targeting large fish for many years and reducing the number of four and five year olds (DFG 1998). An analysis of six tagged groups of Feather River Hatchery spring-run Chinook salmon by Cramer and Demko (1997) indicates that harvest rates of three-year-old fish ranged from 18 percent to 22 percent, four-year-olds ranged from 57 percent to 84 percent, and five-year-olds ranged from 97 percent-100 percent. Reducing the age structure of the species reduces it's resiliency to factors that may impact a year class. In-river recreational fisheries historically have taken fish throughout the species' range. During the summer, holding adult spring-run Chinook salmon are easily targeted by anglers when they congregate in large pools. Poaching also occurs at fish ladders, and other areas where adults congregate, but the significance of poaching on the adult population is unknown.

Several actions have been taken to improve habitat conditions for Central Valley salmonids, including improved management of Central Valley water (e.g., through use of CALFED Environmental Water Account and CVPIA (b)(2) water accounts) and new and improved screen designs at major water diversions along the mainstem Sacramento and San Joaquin

Rivers and major tributaries, and changes in ocean and inland fishing regulations to minimize harvest.

IV. ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The action area for this project includes the stream channels and riparian corridors of the Sacramento River within the river reach starting approximately 1,000 feet upstream of and including CTRMP (Sacramento River mile 55.7), and continuing downstream approximately 2.3 miles below CTRMP (Sacramento River mile 53.5).

A. Status of the Listed Species within the Action Area

1. Sacramento Winter-run Chinook Salmon

Sacramento River winter-run Chinook salmon are currently only present in the Sacramento River below Keswick Dam, and are composed of a single breeding population (NOAA Fisheries 1997; see ///. *Status of the Listed Species).* Winter-run Chinook salmon spawn and rear exclusively in the upper Sacramento River, and are found in the action area seasonally as migrating adults and juveniles. Adults enter San Francisco Bay from November through June (Van Woert 1958), and migrate up the Sacramento River from December through early August. The majority of the run passes RBDD between January and May, peaking in mid-March (Hallock and Fisher 1985). Fry emerge from mid-June through mid-October, and may mass migrate during storm events (NOAA Fisheries 1997).

The emigration of juvenile winter-run Chinook salmon from the Upper Sacramento River is dependent on stream flow conditions and water year type. Emigration past Red Bluff (Sacramento River mile 242) may begin in late July, generally peaks in September, and can continue until mid-March in drier years (Vogel and Marine 1991). The peak emigration of winter-run Chinook salmon juveniles past the project reach corridor generally occurs from September through February, but the range of emigration may extend up to June (Schaffer 1980, Messersmith 1966, DFG 1989, DFG 1993, FWS 1992, FWS 1993, FWS 1994). Adult and juvenile Sacramento River winter-run Chinook salmon use the action area as a migration corridor. Additionally, the action area is used by juveniles as rearing habitat during emigration.

2. Central Valley Spring-run Chinook Salmon

Central Valley spring-run Chinook salmon populations currently spawn in the Sacramento River below Keswick Dam and in tributaries including Mill, Deer, and Butte creeks (DFG 1998). Adult spring-run Chinook salmon enter the mainstem Sacramento River in February

and March, and continue to their spawning streams where they then hold over the summer in deep, cold pools until they spawn in the fall (DFG 2000). In the Sacramento River, juveniles may begin migrating downstream almost immediately following emergence from the gravel with most emigration occurring from December through March (Moyle *et. al.* 1989, Vogel and Marine 1991). Central Valley spring-run Chinook salmon are found in the action area seasonally as migrating adults and juveniles. Additionally, the action area is used by juveniles as rearing habitat during emigration.

3. Central Valley Steelhead

Central Valley Steelhead adults migrate upstream in the Sacramento River during all months except April, May, and June, when they typically return downstream to the ocean. Peak upstream migration occurs in September and February (McEwan and Jackson 1996). Steelhead juveniles and smolts may emigrate from the upper Sacramento River over a prolonged periods (October through early July) (McEwan and Jackson 1966). Yearlings may emigrate from the upper Sacramento River beginning in October and extending through February while sub-yearlings may begin in December and continue through May. There is essentially a single continuous run of Steelhead in the action area as migrating adults and juveniles, and rearing juveniles and fry.

B. Status of Critical Habitat Within the Action Area

The action area is designated critical habitat for Sacramento winter-run Chinook salmon. The essential features of freshwater salmonid habitat within the action include: adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food; riparian vegetation, space, and safe passage conditions.

Land use activities associated with road construction, urban development, agriculture, and recreation have significantly altered fish habitat quantity and quality through alteration of streambank and channel morphology; alteration of ambient stream water temperatures; degradation of water quality; elimination of rearing habitat; fragmentation of available habitats; elimination of downstream recruitment of gravel and large woody debris; and removal of riparian vegetation resulting in increased streambank erosion.

Shaded riparian aquatic (SRA) habitat is necessary for juvenile rearing, and paramount for the survival of fry and subyearlings (FWS 2000). Overhanging vegetation provides shade, moderates water temperatures, and contributes allochthonous material and energy input into river productivity at all trophic levels (Yoshiyama *et. al.* 1998). The increase of riprapping along the Sacramento River and tributaries has removed much instream woody material and therefore areas of refugia providing food, cover, and shelter (FWS 2000). Passage conditions affording safety from extreme water temperatures and flows, predation, and starvation likewise have been compromised with the removal of significant areas of SRA/riparian habitat.

High water quality and quantity are essential for survival, growth, reproduction, and migration of individuals dependent on riparian and aquatic habitats. Important water quality elements include flows adequate to support the migratory, rearing, and emergence needs of fish and other aquatic organisms. Desired flow conditions for salmonids include an annual abundance of cool, well-oxygenated water with low levels of suspended and deposited sediments or other pollutants that could limit primary production and/or invertebrate abundance and diversity.

Water temperature is one of the most important factors controlling early-life survival and growth of Pacific salmon, with direct implications to incubation, hatching, emergence and growth (FWS and BOR 1999). Temperature also influences swimming performance, and vulnerability to predators and disease (FWS and BOR1999). Salmonids are exposed to increased water temperatures from late spring through early fall in the lower Sacramento River reaches and the Delta. These temperature increases are primarily caused by the loss of riparian shading, and by thermal inputs from municipal, industrial, and agricultural discharges.

To a great extent, stream flow volume and runoff patterns regulate the quality and quantity of habitat available to juvenile salmonids. Salmon and Steelhead are adapted to seasonal changes in flow. Increased stream flows in the fall, winter and spring stimulate juvenile salmonid downstream migration, improve rearing habitat, and improve smolt survival to the ocean. Changes in runoff patterns from upstream reservoir storage and water diversion have adversely affected Central Valley salmonids through reduced survival of juvenile fish.

C. Factors Affecting Species Environment within the Action Area

The Sacramento River basin has been transformed from a meandering waterway lined with miles of riparian corridor, to a highly leveed system under varying degrees of control over riverine erosional processes and flooding. This transformation process began about 150 years ago when the Sacramento River was bordered by approximately 500,000 acres of riparian forest, extending up to 4-5 miles along each side of the river and encompassing an area of at least one-half million acres. With the river free from the restrictions of dams and diversions, late summer flows were low in contrast to today's summer flows, probably averaging about 3,000 cfs. Dry-year flows may have dropped to as low as 1,000 cfs. Flows fluctuated widely, however, in response to winter rains, and sustained high flows occurred in the spring each year in response to snow melt (FWS 2000).

The high winter and spring flows resulted in flooding over extensive reaches of the valley floor covered by up to one-half million acres of dense riparian vegetation. Extensive swamps, marshes, and other diverse and expansive wetlands were also nourished by the regular flooding events (FWS 2000).

Bank erosion and river meander, the underlying forces for most riverine ecological processes and functions, were unimpeded. Erosion was most active on the outsides of the numerous meander bends, where the highest velocities impinged directly on the earthen substrates. As

one bank was eroded, the opposite bank experienced sediment accretion and riparian vegetation colonization. Some of the meanders became cut off from the river, forming oxbow Jakes and other broad, diverse channel overflow areas. Erosion also resulted in the input of large volumes of woody debris of a broad range of sizes, types, and complexities into the river. The fish, wildlife, and riparian vegetation of the river were in a dynamic equilibrium, adjusted to, and dependent upon the cycle of erosion, deposition, and changing channel pattern as the river slowly swung back and forth across its meander belt. The ecological health and productivity of the river at any point in time was dependent on periodic rejuvenation associated with these natural processes and changes (FWS 2000).

Bank protection has played a significant role in the loss of this essential riverine and flood plain habitat. Individual bank protection sites typically range from a few hundred to a few thousand linear feet in length. Such bank protection generally results in two levels of impacts to the environment: 1) site-level impacts which affect the basic physical habitat structure at individual bank protection sites; and 2) reach-level impacts which are the accumulative impacts to ecosystem functions and processes that accrue from multiple bank protection sites within a given river reach (FWS 2000). Revetted embankments result in loss of sinuosity and braiding, thereby reducing total area of habitat and degrading the remaining habitat by increasing mean velocity.

Impacts at the reach level result primarily from halting erosion and controlling riparian vegetation. Reach-level impacts which cause significant impacts to fish are reductions in new habitats of various kinds, changes to sediment and organic material storage and transport, reductions of lower food-chain production, and reduction in large woody debris (LWD). Recruitment of LWD is limited to any eventual, long-term tree mortality (i.e., insects, fire, disease, and decadence) and whatever abrasion and breakage may occur during high flows (FWS 2000).

The use of rock armoring limits recruitment of LWD (i.e., from non-riprapped areas), and greatly reduces, if not eliminates, the retention of LWD once it enters the river channel. Riprapping creates a relatively clean, smooth, and featureless surface which diminishes the ability of LWD to become securely snagged and eventually well-anchored by sediment. Wood tends to become only temporarily snagged along riprap, and generally moves downstream with subsequent high flows. Habitat value and ecological functioning aspects are thus greatly reduced, because wood needs to remain in place to generate maximum values to fish and wildlife (FWS 2000).

Central Valley Chinook salmon and Steelhead may be impacted by reductions in the quality of their adult and juvenile migration corridor habitat, as well as juvenile rearing habitat, all of which could be impacted by associated losses of LWD, natural banks and SRA cover. Juveniles probably rely almost exclusively on nearshore LWD and flooded herbaceous vegetation, associated SRA cover and natural bank areas during drier years in which flood bypass flows are low or nonexistent. In addition, juvenile salmonids of the lower Sacramento

River are likely being impacted by reductions, fragmentation, and general lack of connectedness of remaining nearshore refugia areas.

The magnitude and duration of peak flows during the winter and spring are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies. Overall, water management now reduces natural variability by creating more uniform flows year-round. Current flood control practices require peak flood discharges to be held back and released over a period of weeks. Consequently, the mainstream of the river often remains too high and turbid to provide quality rearing habitat.

High water temperatures are a major limiting factor for listed salmonids in the lower Sacramento River (Boles *et al.* 1988). High summer water temperatures in the lower Sacramento River (can exceed 72 °F) create a thermal barrier to the migration of adult and juvenile salmonids (Rich 1920, Kjelson *et al.* 1982, Mitchell 1987). In addition, water diversions, for agricultural and municipal purposes have reduced river flows and increased temperatures during the critical summer months limiting the survival of juvenile salmonids (Reynolds *et al.* 1993, Mitchell 1987, DWR 1988).

Increased sedimentation resulting from agricultural and urban practices within the Central Valley is a cause of salmonid habitat degradation, including the action area. Sedimentation has adversely impacted salmonids during freshwater life stages by clogging, or abrading gill surfaces; inducing behavioral modifications; reducing primary productivity and photosynthetic activity; and dissolved oxygen levels. Embedded substrates have reduced the production of juvenile salmonids and hindered the ability of some over-wintering juveniles to hide in the gravels during high flow events. Increased sedimentation has also been shown to increase water temperatures, thereby directly impacting rearing salmonids.

V. EFFECTS OF THE ACTION

The CTRMP is likely to adversely affect endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead, or the critical habitat of winter-run Chinook salmon during project construction and operation. The project includes design features and procedures intended by the Corps and applicant to avoid or minimize many potential impacts. General adverse effects of the project on the above listed species or critical habitat may include mortality, harassment, or harm due to short term impacts resulting from in-channel construction activities, or long term impacts resulting from habitat loss and human disturbance.

1. Construction Activities

In-channel construction activities that will result from the proposed project include removal of the existing dock remnants, pile-driving, decking and brace assembly and attachment, riprap

installation, and periodic maintenance and repair. Interrelated construction activities include the construction of a three story hotel on the landward side of the existing levee, a bicycle trail, and improvements to existing parking lots and access roads.

Construction activities required for the removal of existing dock remnants, pile-driving and riprap installation may cause a temporary disturbance *(e.g.,* movement, noise, turbidity, *etc.)* within the aquatic nearshore zone, which could affect Sacramento winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or Central Valley Steelhead through disruption of migration, feeding behaviour, and potential increased exposure of juveniles to predation by forcing them from shallow water cover into the open water of the river channel. Food supply for juvenile salmonids also can be affected when sensitive aquatic invertebrate populations are adversely affected by degraded water quality, thereby decreasing their chances for survival.

The effect pile driving has on fish depends upon the pressure, measured in decibels (dB), of a sound or compression wave. Rassmusen (1967) found that immediate mortality of juvenile salmonids may occur at sound pressure levels exceeding 204 dB. Sustained sound pressures (four hours) in excess of 180 dB damaged the hair cells in the inner ear of cichlids (Hastings *et al.* 1996).

Feist *et. al.* (1992) found that pile-driving in Puget Sound created sound within the range of salmonid hearing that could be detected at least 600 m away. Abundance of juvenile salmon near pile driving rigs was reduced on days when the rigs were operating compared to non-operating days. McKinley and Patrick (1986) found that salmon smolts exposed to pulsed sound (similar to pile driving) demonstrated a startle or avoidance response, and Anderson (1990) observed a startle response in salmon smolts at the beginning of a pile driving episode but found that after a few pounding of the pilings fish were no longer startled. This suggests that pile driving or associated activity *(e.g.,* human movement, work boat operation, *etc.)* can cause avoidance of habitat in the immediate vicinity of the project site. If fish move into an area of higher predator concentration *(e.g.,* deeper water), they may experience increased susceptibility to predation and decreased survival.

At the City of Sacramento Water Treatment Plant Fish Screen Project, engineering analysis anticipated that the use of a smaller pile driving hammer that is similar in size to the class of hammer expected to be used at the proposed project, would generate sound pressure levels of 95 to 120 dB. Because of the similarities in river depth, substrate sizes, and size of the pile driver at the City of Sacramento Water Treatment Plant Fish Screen Project and the proposed Project, anticipated sound levels should be below the 200 dB threshold known to cause internal tissue damage to fish. However, the levels may be high enough to affect adult and juvenile salmonids by startling fish and causing avoidance of habitats within 600 m of the noise source.

NOAA Fisheries anticipates that pile driving will be detectable to salmonids up to 600 meters from the source, and that the sounds generated will harass juvenile salmon and Steelhead by causing injury from temporary disruption of normal behaviors such as feeding, sheltering, and migrating that may contribute to reduced or negative growth. Disruption of these behaviors may also lead to increased predation if fish become disoriented or concentrated in areas with

high predator densities. These effects should be small because pile driving will occur during the day, enabling unhindered fish passage at night during peak migration times. The June 1 through August 31 work window will further minimize the extent of the impacts on listed anadromous fish by avoiding the peaks of adult and juvenile migration periods; only a small portion of the listed ESUs should be affected.

The proposed project will result in the installation of 550 feet of riprap and a 1,050 foot floating dock. The dock will have two access ramps anchored to the adjacent shoreline. The existing levees and riprapped banks have reduced the quality of nearshore habitat for salmonids in the project area due to channelization and impaired vegetation growth. Studies have shown a high preference of juvenile salmonids for natural nearshore areas, and the suppression of SRA habitat may hinder their successful rearing (FWS 1993). Nearshore habitat underlying the footprints of the boat docks and overwater portions of the ramps will be impacted by removal of aquatic vegetation, LWD, and other complex structural components of fish habitat and will result in the loss or reduced quality of approximately 1.3 acres of riverine aquatic habitat (area between the ordinary high water mark (OHWM) and the outer limits of the marina footprint) and 1.51 acres of shallow water aquatic habitat (area between OHWM and 3 meters below the ordinary low water mark). However, conservation measures such as the retention of all woody plants greater than 4-inches dbh and the planting of riprap with willow wattles and ballast buckets will provide some SRA. Additionally, the eco-dock could provide an additional 1,800 square feet of future SRA. Changes in vegetation growth and distribution coupled with changes in shade or water movement can affect both water temperature and dissolved oxygen levels in the action area. These habitat components are of critical importance to rearing and migrating Chinook salmon and Steelhead, which may avoid aquatic habitat that is too warm or has insufficient oxygen. A water quality monitoring program has been included as a conservation measure to monitor the effect of the proposed project on water quality. The simple structure of the dock and pilings can attract predatory fish species, or alternatively may be used by juvenile salmonids for protection from predation.

Interrelated construction activities occurring outside of the action area for the hotel and bicycle trail are not expected to affect listed salmonids or adversely modify Sacramento River winter-run Chinook salmon critical habitat. Improvements to the existing parking areas and access roads will result in the removal of native riparian herbaceous vegetation and some SRA. These impacts will be minimized or avoided through onsite restoration and protection of existing habitat as proposed in the conservation measures of the project description. The effects of Stormwater runoff and resultant sediment/contaminant input to the Sacramento River will be minimized or avoided by regrading and incorporating sand/soil interceptors to reduce pollutants and redirect runoff into the City of Sacramento's Stormwater collection system.

Overall, NOAA Fisheries expects that the loss of SRA and nearshore aquatic habitat in the action area may adversely affect the migration and rearing of listed juvenile Chinook salmon and Steelhead through the reduction of habitat complexity necessary for refugia and foraging, changes in water temperatures and dissolved oxygen levels, and increased exposure to predation. The entire Sacramento River winter-run Chinook salmon ESU and Central Valley spring-run Chinook salmon ESU, and a large portion of the Central Valley Steelhead ESU, pass by the project site. Thus, a large portion of the juveniles from each ESU may be

affected. However, it is expected that the adverse effects of SRA and nearshore aquatic habitat loss will be limited because of the relatively short length of the Sacramento River that will be affected, and also that they will be reduced over time with successful implementation of the project's conservation measures.

2. Marina Operations

The noise, disturbance, and pollution resulting from dock use and increased boating activity in the nearshore area can interrupt the feeding or migration of juvenile or adult Steelhead, or cause them to avoid the nearshore area.

The increased frequency of boat wakes resulting from the project can lead to increased erosion, siltation, sedimentation, or damage to riparian vegetation in the Sacramento River. Fuel spills may occur during boat operation. Effects of these water quality impacts to salmonids and their habitat would be similar to those described for project construction above.

Unlike construction impacts, operational impacts will occur indefinitely and will not be limited to the period from June 1 to August 31. Therefore, both rearing and migrating juvenile or adult Chinook salmon and Steelhead may be impacted by degraded habitat or degraded water quality in the Sacramento River. Long term adverse impacts to salmonids resulting from dock operation will be avoided or minimized through avoiding the removal of trees larger than 4 inches in diameter during project construction *(i.e.,* which will aid in long-term soil stabilization and contribute to shade and aquatic habitat complexity), enforcement of the proposed 5 mph speed limit to minimize the effect of boat wakes, water quality monitoring, eco-dock construction, and restoration of riparian vegetation at the proposed project site.

Operation of the CTRMP is not expected to affect the survival and recovery of endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead, or diminish the value of winter-run Chinook salmon critical habitat. Long-term impacts of project operation to listed Chinook salmon and Steelhead are expected to be limited by the constraints of the monitoring program (requiring consultation with NOAA Fisheries and FWS if monitoring data demonstrate negative impacts), and alleviated by the restoration and creation of SRA habitat on site, marina operational restrictions (no permanent boat stowage, fueling stations, sewage pump-out, *etc.)* and enforcement of boat speed in the action area.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Ongoing urban activities likely will continue to affect Stormwater runoff patterns and water quality in the action area, and thus result in cumulative effects to listed chinook salmon and

steelhead. Future population growth and resulting urban development may adversely affect water quality, riparian function, and stream productivity.

VII. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead, the environmental baseline for the action area, the effects of the proposed CTRMP, and the cumulative effects, it is NOAA Fisheries biological opinion that the CTRMP, as proposed, is not likely to jeopardize the continued existence of the endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead, and is not likely to destroy or adversely modify Sacramento River winter-run Chinook salmon designated critical habitat.

VIII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. NOAA Fisheries defines the term "harm" as an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impacts of incidental take, the Corps and the applicant must report the progress of the action and its impact on the species to the Service as specified in this Incidental Take Statement. [50 CFR §402.14(I)(3)]

A. Amount or Extent of Take

NOAA Fisheries anticipates incidental take of juvenile and adult Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley Steelhead from the CTRMP due to physical disturbance and loss of habitat quality. Incidental take in the form of harm and harassment is expected to occur from removal of the existing dock, pile-driving and other in-stream construction activities; SRA and riparian habitat lost to the footprint of the new dock and riprapped shoreline; and increased erosion, pollution, and disturbance attributable to boats utilizing the marina. Determining the precise number of individuals taken by the project is not feasible because impaired individuals will be difficult to detect, and project effects on salmon and Steelhead are likely to be confounded with those from other sources. However, the following level of incidental take from project activities is anticipated:

1. All rearing or migrating juvenile Chinook salmon and Steelhead harmed or harassed from pile-driving or other in-channel construction activities occurring during dock construction. In-channel construction activities are limited to the removal of an existing dock and barge and the installation of up to 32 piles in the Sacramento River during the period between June 1 and August 31.

2. All rearing or migrating juvenile Chinook salmon and Steelhead harmed or harassed by the approximately 1.3 acres of SRA habitat and 1.51 acres of shallow water aquatic habitat that will be permanently lost or reduced in quality due to dock construction and associated riprapping of shoreline, including predatory interactions attributable to the presence of the docks.

3. All rearing or migrating adult and juvenile Chinook salmon and Steelhead harmed from pollutants such as hydrocarbons, heavy metals, sewage, eroded sediments, or noise or other disturbance attributable to boats used by CTRMP owners and guests. Eroded sediments, noise, and disturbance from operation of CTRMP boats is not expected to exceed that allowed by adherence to the established 5 mph speed restriction in the river reach starting at approximately Sacramento River mile 55.5 and continuing downstream to Sacramento River mile 53.5.

B. Effect of Take

In the accompanying biological opinion, NOAA Fisheries has determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

C. Reasonable and Prudent Measures

Pursuant to section 7(b)(4) of the ESA, the following reasonable and prudent measures are necessary and appropriate to minimize take of endangered Sacramento River winter-run salmon, threatened Central Valley spring-run Chinook salmon and threatened Central Valley Steelhead:

1. The Corps shall ensure that measures are taken to maintain fish passage for salmonids through the project site; and

2. The Corps shall ensure that impacts resulting from permanent habitat loss or reduction in quality or function are minimized.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline prescribed reporting/monitoring requirements. These terms and conditions are non-discretionary, and have been developed based on the assumption that all project conservation and restoration measures identified on pages 3 to 5 of this Opinion will be implemented.

1. The Corps shall ensure that measures are taken to maintain fish passage for salmonids through the project site.

a. The Corps shall establish non-work periods of at least eight hours at night to allow quiet migration conditions for anadromous fish.

b. The Corps shall remain informed of the pile driving acoustic monitoring at the marina construction site. If monitoring for that project indicates that underwater sound levels exceed 120 dB, Corps shall develop an acoustic monitoring plan to determine the actual noise levels generated during the CTRMP construction.

2. The Corps shall ensure that impacts resulting from permanent habitat loss or reduction in quality are minimized.

a. The proposed water quality monitoring program shall be developed with input from NOAA Fisheries. Additionally, the monitoring program shall assess the effectiveness of the eco-dock in creation of new SRA habitat, survival of planted vegetation *(e.g.,* ballast buckets and trees), and post-construction measurement of successful SRA added by project. A monitoring report shall be submitted December 31 of years in which monitoring information is collected to:

Supervisor, Protected Resources Division
National Marine Fisheries Service
Sacramento Area Office
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814-4706

b. The EPA has provided draft guidance for controlling nonpoint source pollution resulting from recreational boating activities (Environmental Protection Agency 2001).

This document shall be provided to Captain's Table Resort and Marina guests in either paper or electronic form.

IX. CONSERVATION RECOMMENDATIONS

Section 7(a)(l) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat, to help implement recovery plans, or to develop information.

In order to fulfill their obligations under Section 7(a)(l) of the Act, the Corps should coordinate with the various entities involved in managing the Sacramento River to provide sufficient flows at the appropriate times of year, to enhance critical habitat (instream and SRA) and water temperature.

In order for NOAA Fisheries to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NOAA Fisheries requests notification of the implementation of any conservation recommendations.

X. REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the proposed construction and operation of CTRMP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take authorized in the accompanying incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation must be reinitiated immediately.

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Enclosure 2

Magnuson-Stevens Fishery Conservation and Management Act

ESSENTIAL FISH HABITAT CONSERVATION RECOMMENDATIONS[1]

Captain's Table Resort & Marina Project

I. IDENTIFICATION OF ESSENTIAL FISH HABITAT

The geographic extent of freshwater essential fish habitat (EFH) for the Pacific salmon fishery includes waters currently or historically accessible to salmon within specific U.S. Geological Survey hydrologic units (Pacific Fisheries Management Council 1999). For the Sacramento River watershed, the aquatic areas identified as EFH for Chinook salmon are within the hydrologic unit map numbered 18020109 (Lower Sacramento River) and 18020112 (upper Sacramento River to Clear Creek).

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of essential fish habitat, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means habitat required to support a sustainable fishery and a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

The associated Captain's Table Resort & Marina Project biological opinion thoroughly addresses the impacts of the Captain's Table Resort & Marina project on Sacramento winter-run Chinook salmon *(Oncorhynchus tshawytscha)* and Central Valley spring-run Chinook salmon *(O. tshawytscha),* which are both listed under the Endangered Species Act (ESA) as well as covered by the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Therefore, this EFH consultation will concentrate most heavily on Central Valley fall-/late fall-run Chinook salmon *(O. tshawytscha)* which also is covered under the MSA, but not listed under the ESA.

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[1] The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth new mandates for the National Marine Fisheries Service (NOAA Fisheries) and federal action agencies to protect important marine and anadromous fish habitat. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NOAA Fisheries regarding potential adverse effects of their actions on EFH, and respond in writing to NOAA Fisheries "EFH Conservation Recommendations." The Pacific Fisheries Management Council has identified essential fish habitat (EFH) for the Pacific salmon fishery in Amendment 14 to the Pacific Coast Salmon Fishery Management Plan.

The Sacramento, Feather, Yuba, American, Cosumnes, Mokelumne, Stanislaus, Tuolumne, Merced, and San Joaquin rivers, and many of their tributaries, support wild populations of the fall/late-fall Chinook salmon ESU. However, forty to fifty percent of spawning and rearing habitats once used by these fish have been lost or degraded. Fall/late-fall run (herein "fall-run") Chinook salmon were once found throughout the Sacramento and San Joaquin River drainage, but have suffered declines since the mid-1900s as a result of several factors, including commercial fishing, blockage of spawning and rearing habitat, water flow fluctuations, unsuitable water temperatures, loss of fish in overflow basins, loss of genetic fitness and habitat competition due to straying hatchery fish, and a reduction in habitat quality.

Life History and Habitat Requirements

Central Valley fall-run Chinook salmon are "ocean-type", entering the Sacramento and San Joaquin Rivers from July through April, and spawning from October through December in swift, relatively shallow riffles or along the edges of fast runs at depths greater than 6 inches, usually 1 to 15 feet (Reynolds *et. al.* 1993). Preferred spawning substrate is clean loose gravel. Gravels are unsuitable for spawning when cemented with clay or fines, or when sediments settle out onto redds reducing intergravel percolation (NOAA Fisheries 1997).

Eggs incubate from October through March, and juveniles rear and smolts emigrate from January through June (Reynolds *et. al.* 1993). Shortly after emergence from their gravel nests, most fry disperse downstream towards the Delta and estuary (Kjelson *et. al.* 1982). The remainder of fry hide in the gravel or station in calm, shallow waters with bank cover such as tree roots, logs, and submerged or overhead vegetation. These juveniles feed and grow from January through mid-May, and emigrate to the Delta and estuary from mid-March through mid-June (Lister and Genoe 1970). As they grow, the juveniles associate with coarser substrates along the stream margin or farther from shore (Healey 1991). Along the emigration route, tributary streams are used as rearing habitat. These non-natal rearing areas are highly productive micro-habitats providing abundant food and cover for juvenile Chinook salmon to grow to the smolt stage, when they undergo a physiological transformation that allows them to enter saltwater. These smolts generally spend a very short time in the Delta and estuary before entry into the ocean.

In contrast, the majority of fry carried downstream soon after emergence are believed to reside in the Delta and estuary for several months before entering the ocean (Healey 1980, 1982; Kjelson *et. al.* 1982). Principal foods of juvenile Chinook salmon while rearing in freshwater and estuarine environments include larval and adult insects and zooplankton such as *Daphnia* as well as other estuarine and freshwater invertebrates. Whether entering the Delta or estuary as a fry or juvenile, fall-run Chinook salmon depend on passage through the Sacramento-San Joaquin Delta for access to the ocean.

II. PROPOSED ACTION

The proposed action is described in the *Description of the Proposed Action* section of the associated biological opinion (Enclosure 1) on endangered Sacramento River winter-run

Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead.

III. EFFECTS OF THE PROPOSED ACTION

The effects of the proposed action on Pacific Coast salmon EFH would be similar to those discussed in the *Effects of the Proposed Action* section of the associated biological opinion (Enclosure 1) for endangered Sacramento River winter-run Chinook salmon, threatened Central Valley spring-run Chinook salmon, and threatened Central Valley Steelhead. These impacts include temporary disturbance from in-channel construction activities and degradation of water quality from increased temperature, suspended sediment and other pollutants during project construction and operation.

IV. CONCLUSION

Based on the best available information, NOAA Fisheries believes that some aspects of the proposed Captain's Table Resort & Marina project are likely to adversely affect EFH for Central Valley fall-/late fall-run Chinook salmon managed under the Pacific Coast Fishery Management Plan.

V. EFH CONSERVATION RECOMMENDATIONS

The habitat requirements of Central Valley fall-/late fall-run Chinook salmon within the action area are similar to those of the federally listed species addressed in the attached biological opinion. Therefore, NOAA Fisheries recommends that Term and Condition 1 listed in the Incidental Take Statement of the attached biological opinion prepared for the Sacramento winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead be adopted as an EFH conservation recommendation.

VI. ACTION AGENCY STATUTORY REQUIREMENTS

Section 305(b)4(B) of the MSA required that the U.S. Army Corps of Engineers (Corps) to provide NOAA Fisheries with a detailed written response within 30 days, and 10 days in advance of any action, to the EFH conservation recommendations, including a description of measures adopted by the Corps for avoiding, minimizing, or mitigating the impact of the project on EFH (50 CFR §600.920[j]). In the case of a response that is inconsistent with our recommendations, the Corps must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NOAA Fisheries over the anticipated effects of the proposed action and the measures needed to avoid, minimize, or mitigate such effects.

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